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DILLON & YUDELL LLP
8911 N. CAPITAL OF TEXAS HWY.,
SUITE 2110
AUSTIN, TX 78759

EXAMINER	
CHANG, ERIC	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/754,483
Filing Date: January 04, 2001
Appellant(s): ODAOHHARA, SHIGEFUMI

Antony P. Ng
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 11, 2005 appealing from the Office action mailed August 4, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

U.S. Patent 6,150,798 to Ferry et al.

U.S. Patent 5,498,984 to Schaffer

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-10, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,150,798 to Ferry et al., in view of U.S. Patent 5,498,984 to Schaffer.

As to claim 6, Ferry discloses a voltage converter comprising a first and a second power supply circuit [FIG. 3, elements 11 and 12] each capable of converting an input voltage into an output voltage [col. 1, lines 5-7], and means for providing a control signal [FIG. 3, element 13] to activate one of the power supply circuits based on an amount of voltage supplied to said first

and second power supply circuits [col. 3, lines 18-39]. Ferry further discloses that the power supply circuits are disposed in parallel [FIG. 3, and col. 4, lines 37-44], wherein only one voltage regulator is active at a time [col. 3, lines 27-35].

Ferry teaches the limitations of the claim, including activating either said first or second power supply circuit based on detecting the amount of voltage supplied to the power supply circuits [col. 6, lines 44-51], and although voltage and current are directly proportional characteristics of electric flow, Ferry does not specifically teach detecting the amount of current supplied.

Schaffer teaches that it is well known in the art to use a current sense amplifier to measure the amount of current supplied to a power supply in various types of electronic equipment [col. 1, lines 9-15]. Thus, Schaffer teaches power supply detection similar to that of Ferry. Schaffer further teaches detecting the flow of current from a battery to a load [col. 8, lines 19-22], and that a current level can be easily converted to a voltage level [col. 8, lines 35-36].

At the time that the invention was made, it would have been obvious to a person of ordinary skill in the art to employ the power supply detection means as taught by Schaffer. One of ordinary skill in the art would have been motivated to do so so that the current being supplied to a voltage converter can be converted into a voltage for determining which of the two power supply circuits should be activated.

It would have been obvious to one of ordinary skill in the art to combine the teachings of the cited references because they are both directed to the problem of detecting power being supplied from power source such as a battery in order to properly supply said power to electronic equipment. Moreover, the power supply detection means taught by Schaffer would improve the

design of Ferry because it allowed for a more efficiently designed current sense amplifier for the detection of current [col. 1, lines 51-59], such as the current supplied to a power supply circuit.

As to claim 7, Ferry discloses the first power supply circuit is a linear, or series, power supply circuit [12], and the second power supply circuit is a switching power supply circuit [11].

As to claim 8, Ferry discloses the first power supply circuit is efficient during a low load demand [col. 2, lines 38-46], and the second power supply circuit is efficient during a high load demand [col. 2, lines 34-38].

As to claim 9, Ferry discloses the first power supply is activated when the voltage amount available from a battery is lower than a predetermined threshold, and the second power supply is activated when the voltage amount is higher than a predetermined threshold [col. 6, lines 62-65]. Schaffer teaches detecting a current supplied from a battery [col. 8, lines 19-22], and that a detected current level can be easily converted to a voltage level [col. 8, lines 35-36].

As to claim 10, Ferry discloses the current amount is low when the voltage converter is in a suspended state, and high when the voltage converter is in a non-suspended state [col. 6, lines 55-61].

As to claim 12, Ferry discloses the first and second power supply share a common voltage input [FIG. 3, element 2/Vbat] and common voltage output [FIG. 3, element S/Vout].

As to claim 13, Schaffer discloses using a current sense amplifier to detect the amount of current supplied to various types of electronic equipment [col. 1, lines 9-15].

(10) Response to Argument

Applicant's arguments filed August 11, 2005 have been fully considered but they are not persuasive.

In the remarks on page 4, applicants argued in substance that Ferry does not teach or suggest that the detecting circuit makes its selection based on the amount of current supplied to a first and a second power supply circuit. The examiner disagrees. Ferry teaches using a signal [TU] indicative of the charge state of the battery with respect to a threshold value [col. 6, lines 44-46], and that power from said battery is supplied to the first and the second power supply circuit [col. 3, lines 21-25]. Schaffer teaches that current can be detected from a battery to a load [col. 8, lines 19-22], and that a current level can be easily converted to a voltage level [col. 8, lines 35-36]. Applying the teachings of Schaffer to the voltage disclosed by ferry would result in an indication of current. Thus, Ferry in view of Schaffer teaches detecting an amount of current supplied to the power supply circuits.

In the remarks on page 5, applicants argued in substance that the TU signal indicative of the charge of the battery is not the same as an amount of current supplied to said first and second power supply circuits because signal TU is not quantified in the form of current. Schaffer

teaches detecting the flow of current from a battery to a load [col. 8, lines 19-22], and that a current level can be easily converted to a voltage level [col. 8, lines 35-36]; thus, Schaffer teaches detecting the voltage level of a battery charge. Ferry teaches determining a charge state of a battery with respect to a threshold value [col. 6, lines 44-46] and indicating the determination by signal [TU]. Thus, signal [TU] is representative of the current supplied from the battery, because its value is determined by the current being supplied from a battery.

In the remarks on page 5, applicant has argued that neither Ferry nor Schaffer disclose a current quantification. The examiner agrees; however, the claims do not require that the determination be made based on a signal quantified in the form of current.

In the remarks on page 5, applicants argued in substance that Ferry does not teach or suggest switching between a first series power supply circuit and a second switching power supply circuit based on the detected current supply. But as Applicant admits in the arguments, Ferry's voltage regulator has three possible operating modes other than the switched-mode power supply operation. Furthermore, Ferry teaches that the three non-switched-mode power supply operations [THRU, SLEEP, LDO] also correspond to the series power-supply operating mode [col. 6, lines 39-65]. In addition, Ferry teaches that the mode control circuit [13] clearly controls the activation of the first series power supply circuit and the second power supply circuit via control lines [18 & 19], for example, based on a detected current supply signal [TU]. Thus, Ferry teaches that the switching of the voltage converter between a switched-mode power supply and a series-mode power supply.

In response to applicant's argument that the THRU mode can be used if an output terminal S is only connected to the input of a step-down post-regulator, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. However, because the teachings of Ferry and Schaffer are capable of activating either a first or a second power supply circuit based on an amount of current supplied to said first and second power supply circuits, it is capable of performing the intended use, regardless of what the output of the power supply circuits are further connected to, such as additional post-regulators.

In the remarks on page 5, applicants again argued in substance that because TU signal is not quantified in the form of current, Shaffer's current sense amplifier cannot render the same voltage-current relationship for the purpose of selecting one of the two power supply circuits. As discussed above, Shaffer teaches detecting the flow of current from a battery to a load [col. 8, lines 19-22], and that a current level can be easily converted to a voltage level [col. 8, lines 35-36]. Thus, the determination of the voltage level used by Ferry is established by using the current sense amplifier as taught by Schaffer on the battery power supply, and Ferry teaches that the selection of one of the two power supplies is made from this determination [col. 6, lines 44-51].

In short, Ferry teaches a voltage regulator that can alternate between a switched-mode power supply and a series-mode power supply. Ferry teaches that the selection can be made based on the current consumed by the load [col. 3, lines 18-26]. However, Ferry also discloses that the selection is further made by determining the voltage supplied to the voltage regulator [col. 3, lines 27-34], and that a number of other factors cause the voltage regulator to change between the switched-mode power supply and the series-mode power supply [col. 6, lines 35-65], including a detected available voltage [col. 6, lines 39-47]. Because Schaffer teaches determining an available voltage based on the supplied current, it would be obvious to use such a teaching to use a detection of the supplied current to activate either said first or second power supply, substantially as claimed.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Eric Chang EC

REHANA PERVEEN
SUPERVISORY PATENT EXAMINER
10/27/06

Conferees:

LYNNE H. BROWNE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Lynne Browne

Rehana Perveen

REHANA PERVEEN
SUPERVISORY PATENT EXAMINER
10/27/06